

## Financial Engineering Conference

This newsletter is devoted to a review of a highly successful Financial Engineering conference, organised by **ac3**, on November 27 last year.

There were 85 attendees, split fairly evenly between industry and academia. There were 15 speakers in all, drawn from industry and research.

### The view from industry

The morning focussed on industry views and was chaired by Les Hosking, CEO of AXISS Australia. The opening speaker was Dr Volf Frishling, Chief Manager, Quantitative Research Risk at the Commonwealth Bank, who presented on measuring market and credit risk.



A view of some of the 85 delegates who attended the inaugural **ac3** Financial Engineering conference.

This was followed by Professor Carl Chiarella from UTS with an entertaining talk *The Financial Engineer grapples with Higher Dimensions*.

A panel session on the topic *Towards real time in Risk Management* ensued. The panel included the chief quantitative analysts from the major Australian banks, including Dr John Green of Macquarie Bank, Dr Sean Carmody of Westpac, Dr Volf Frishling of CBA, and Professor Mike Briers of SIRCA. Bob Stribling's presentation appears later.

Dr Rob Bursill of *SuperQuant* presented results of various case studies where the performance of risk modelling at 2 major Australian banks had been improved by up to 2 orders of magnitude using ac3's NEC SX-5 vector supercomputer.

### New web presence

**ac3** has a new web presence! Check out [www.ac3.com.au](http://www.ac3.com.au). Amongst other information, there is a comprehensive description of our facilities.

Is the *Flash* front page appropriate? Appreciate your feedback! Email [pmc@ac3.com.au](mailto:pmc@ac3.com.au).

### Research forum

The afternoon session, chaired by Professor Tony Hall of UTS, the Research Director of ac3's new Centre of Expertise in Computational Finance, presented research findings from academics and finance industry practitioners.

Professor Eckhard Platen of UTS discussed a consistent simulation approach to financial modelling, risk measurement, derivative pricing and portfolio optimisation in his presentation, *High performance computing and numerical solution of stochastic differential equations*.

Professor Doug Foster of AGSM outlined a number of shortcomings of the classical statistical approach to decision-making under uncertainty, and proposed a solution using numerical techniques to exploit the power of Bayesian methods.

Associate Professor Jayaram Muthuswamy of the University of Sydney presented an entertaining talk demonstrating that *nonsynchronicity* in asset prices can cause severe statistical biases to occur, especially when observed high frequency returns differ significantly from true equilibrium returns.

### Weather derivatives

Dr. Adam Kucera of EdgeCap and Dr Harvey Stern, Australian Bureau of Meteorology, presented *Pricing Weather Derivatives*. They provided an overview of weather derivative products and the strategies for applying risk management products.

### Energy Market Pricing

In his presentation, *Challenges of Pricing and Risk Management of Energy Derivatives*, Dr Les Clewlow, Director of Lacima Group, reviewed the key properties required for realistic models of energy market prices.

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The **ac3** Financial Engineering Conference was generously sponsored by NEC, T-Systems, Derivatives Weekly and AXISS Australia.

Copies of the presentations can be found at: <http://www.ac3.com.au/conf/presentations/>.

## The Coming Demise of Credit Limits

An excerpt of a presentation by Bob Stribling, Head of Market Risk at ANZ, at the ac3 Financial Engineering Conference.

What is Banking? Banks take in deposits on one side of the ledger, and lend them out on the other side of the ledger. Since the beginning of time a large part of the *art of banking* has been all about the setting and management of credit limits. However in the next 5 to 10 years, I think this is all about to change.



Bob Stribling of ANZ presenting at the ac3 Financial Engineering Conference

As an opening hypothesis, I would assert that Credit Limits are a crude medieval concept. In essence they serve as a simple proxy for capital, because in days gone by bankers have not had the means to properly calculate and model capital at risk for each new loan. This is changing!

We now have the ability to model default dynamics on a portfolio basis using KMV or Credit-Metrics style analytics, usually through some compute-intensive simulations. We are even getting to the point where some banks can crudely estimate the *marginal* capital implications for new loans, and factor these into pricing. I do emphasise the word *crudely* – in most cases the asset profile against which each new loan is modelled is usually from last month-end or sometimes from the prior quarter-end.

Notwithstanding this, we bankers are quite proud! We think we've become really advanced in our modelling capabilities. However I think we've only just begun... Every new loan that gets created changes the mix of a bank's portfolio. Some deals reduce the risk through diversification; others increase the risk through concentration. To correctly price every new transaction at the time it is booked, the bank really should re-run the full portfolio to model the marginal impact on credit risk – *and this is where I think we are heading*.

For those of you who know banking you are probably sceptics thinking "This will never happen".

You might argue that the degree of precision gained from such compute effort is not worth the cost or complexity. Many would think it unlikely banks would expend the effort or the \$\$\$ to achieve such precision.

ME! I think the cat is already out of the bag, and it's the banks that have cut it loose! Why? Current bank capabilities to factor marginal capital implications of new deals, while based on stale portfolio data, are already showing differences in pricing for clients between banks.

Contrary to the myth perpetrated by our worship at the shrines of Reuters or Bloomberg screens, companies are starting to realise that the *price of credit* for their name is not a constant. Different banks have different portfolios, which are uniquely impacted by a given new loan. Even across time, for the same client a year later, where there is no fundamental change in their credit profile, their borrowing margin over *govies* will be different, given that the bank's portfolio will have changed its composition.

As companies start to pick this up, they are realising the value in *shopping* their credit needs across different banks. Banks that can price more sharply, because they understand the portfolio dynamics of their book, will naturally win more of the best business. Less sophisticated banks will start to notice this, will figure out what's happening, and will start to invest more in sophisticated modelling capability.

Hence the next great wave of a Darwinian struggle for the survival of the fittest is about to begin. Banks will need to start modelling the marginal value of each new loan on their TOTAL portfolio on a global, real-time basis.

And I predict that we'll see banks push increasingly into using supercomputers as a means to support this drive, or they'll support the development of new peer-to-peer computing techniques to harness the computing power of thousands of PCs on internal networks.

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### Financial Engineering Conference (cont'd)

Dr Zili Zhu from CSIRO provided an overview of a finite-element platform developed by CSIRO, that can be used as an efficient tool to compute various derivatives, ranging from interest-rate market to equity and energy markets.

Dr. Pavel Shevchenko, also from CSIRO, outlined an efficient implementation of the stochastic mesh method for pricing multi-dimensional American options. The algorithm is highly vectorisable and lends itself to vector supercomputers.

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